IN THE SPECIFICATION

Please amend the specification as follows:

Replace the paragraph on page 1, between lines 1-13 of the specification with the following:

The invention relates to a read and/or write head for an optical disk drive, comprising a lens holder, a support frame, means for suspending the lens holder in the support frame, which means constrain movement of the lens holder relative to the support frame, allowing only an at least limited translation in a ~~focussing~~focusing direction, parallel to the optical axis of a lens in the lens holder, an at least limited translation in a tracking direction, perpendicular to the ~~focussing~~focusing direction, and an at least limited rotation about an axis in a tangent direction, perpendicular to both the ~~focussing~~focusing and the tracking direction, and actuator means, comprising two conductive ~~focussing~~focusing coils with a winding axis parallel to the ~~focussing~~focusing direction, each positioned relative to a magnetic circuit in such a way that a current flowing through a coil gives rise to a force between the lens holder and the support frame in the ~~focussing~~focusing direction, the winding axes of the two ~~focussing~~focusing coils being positioned on opposite sides of a plane through the center of mass of the lens holder and parallel to the ~~focussing~~focusing and the tangent direction.

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Replace the paragraph on page 1, between lines 16-28 of the specification with the following:

An example of a read/write head of the type mentioned in the opening paragraph is known from US-A 5 905 255. This document discloses an embodiment of an objective lens driver comprising a movable member. An objective lens, a lens holder, and a first and a second permanent magnet, fixed on the lens holder, constitute the movable member. The objective lens and the first and the second permanent magnet are disposed symmetrically about a plane of symmetry which extends through the center of gravity of the lens holder and is parallel to the ~~focussing~~focusing direction and the tangent direction. Four wire members are stretched parallel to the tangent direction between a holding member and the lens holder. First and second bobbins are vertically disposed on a fixed base so that they are located side by side in the tracking direction. They are formed by yokes comprising a magnetic plate, extending in the ~~focussing~~focusing direction and the tracking direction, around which are wound tracking coils having the winding axis in the tracking direction and ~~focussing~~focusing coils having the winding axis in the ~~focussing~~focusing direction.

Replace the paragraph on page 2, between lines 1-10 of the specification with the following:

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The known arrangement has the disadvantage that the dimensions of the magnetic plates, the winding of the ~~focussing~~focusing coil around the tracking coil, and the positioning of the bobbins side by side in the tracking direction lead to a relatively large dimension in the tracking direction. In an optical disk drive, the read/write head is moved in a radial direction relative to the disk to be read or written. Its orientation is such that the tracking direction is aligned in this radial direction. As large an area of the disk as possible should be used for recording and reading data. However, the lens of a read/write head with large dimensions in the tracking direction cannot be moved close to the axis of rotation of the disk, since the driving arrangement used to rotate the disk will interfere with such a lens holder.

Replace the paragraph on page 2, between lines 15-16 of the specification with the following:

This object is achieved by the read/write head according to the invention, which is characterized in that the ~~focussing~~focusing coils are spaced apart in the tangent direction.

Replace the paragraph on page 2, between lines 17-23 of the specification with the following:

Because the ~~focussing~~ focusing coils are spaced apart in the tangent direction, a more compact arrangement can be obtained,

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since the distance between the winding axes of the coils in the tracking direction can be made smaller than the outer dimensions of the coils without the coils making contact. At the same time, due to the arrangement of the coils on opposite sides of the plane parallel to the ~~focussing~~focusing and the tangent direction, a tilting action can be obtained when the two ~~focussing~~ focusing coils are driven in anti-phase. The ~~focussing~~ focusing coil configuration will generally be restricted to said two ~~focussing~~focusing coils.

Replace the paragraph on page 2, between lines 24-27 of the specification with the following:

An arrangement wherein the ~~focussing~~focusing coils are spaced apart in the tangent direction is known. However, in this known arrangement the ~~focussing~~focusing coils are both centered on the plane parallel to the ~~focussing~~focusing and the tangent direction, so that no tilting action is possible.

Replace the paragraph on page 2, line 32 of the specification with the following:

Preferably, the two ~~focussing~~focusing coils are mounted on the lens holder.

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Replace the paragraph on page 3, lines 4-5 of the specification with the following:

Preferably, each magnetic circuit comprises a yoke extending at least partly through the corresponding ~~focussing~~focusing coil along its winding axis.

Replace the paragraph on page 3, lines 7-11 of the specification with the following:

Preferably, each magnetic circuit forms a loop in a plane parallel to the ~~focussing~~focusing and the tangential direction and comprises an air gap through which the windings of the corresponding ~~focussing~~focusing coil can move, at least one radial coil being mounted on the lens holder and located in each air gap with a winding axis aligned with the flux through the magnetic circuit.

Replace the paragraph on page 3, lines 12-16 of the specification with the following:

Thus, translations in the tracking direction can be controlled. Only one magnetic circuit is used on each side of the lens holder for all three types of actuation mentioned. The manner

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in which ~~focussing~~focusing coils and radial coils are driven determines the position and orientation of the lens holder, that is, within the constraints provided by the means via which the latter is suspended in the support frame.

Replace the paragraph on page 4, lines 3-11 of the specification with the following:

In the example of the Figs. 1 and 2, a light beam 4 is reflected in the direction of the disk 1 by means of a mirror 5 which is part of a read/write head 6. This description will use the term read/write head, since many disk drive systems allow information to be written to the disk 1 optically. The light beam 4 will then have a different power level and/or wavelength, but must also be ~~focussed~~focused onto a point in the disk 1, as is the case when the disk 1 is being read. The read/write head 6 is intended for ~~focussing~~focusing a beam onto the disk 1 for either reading or writing or both. Parts of the read/write head 6 that are relevant to the explanation of the invention are shown in the Figs. 1 and 2. Light reflected by the mirror 5 is ~~focussed~~focused onto the disk 1 by means of an objective lens 7 situated in a lens holder 8.

Replace the paragraph on page 4, lines 12-22 of the specification with the following:

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In a typical optical disk system, the information tracks 2 are very closely spaced in the radial direction, in order to fit as much information as possible onto the disk 1. In a Compact Disk (CD) the distance is 1.6 μm, while in a Digital Versatile Disk (DVD) the distance is 0.74 μm. There is a tendency towards smaller track distances in newer systems, as sources of (laser) light of smaller wavelengths and objective lenses 7, or lens systems, with a higher numerical aperture become available. In the configuration shown in Fig. 1, the light beam 4 is aligned in a radial direction relative to the disk 1. The position and orientation of the mirror 5 and the objective lens 7 determine the point on the disk 1 at which the light is ~~focussed~~focused. Smaller distances between successive information tracks 2 are made possible by more accurate actuator arrangements for controlling the position and orientation of the read/write head 6.

Replace the paragraph on page 4, lines 23-28 of the specification with the following:

The position of the read/write head 6 as a whole in the radial direction of the disk 1 may be controlled by means of a worm wheel acting on a slide or sledge (not shown) and driven by a sledge motor (not shown). However, fine-tuning of the position of the ~~focussing~~focusing point in the disk 1 is then carried out by adjusting the position of the lens holder 8 relative to the rest of

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the read/write head 6. To this end, the read/write head 6 comprises a support frame which is fixed to or forms part of the sledge.

Replace the paragraph spanning pages 4-5, between line 29, page 4 and page 5, line 5 of the specification with the following:

The lens holder 8 is suspended in the support frame in such a way that its movement relative to the support frame is constrained. Referring to Fig. 1, the lens holder 8 is first of all capable of carrying out translations in a ~~focussing~~focusing direction z. That is, it can be moved closer or further away from the disk 1. In this way, the exact point in the disk 1 on which the light is ~~focussed~~focused can be adjusted. Secondly, the lens holder 8 can carry out translations in a tracking direction y. By varying the position of the lens holder 8 in the tracking direction, the position on which the light beam 4 is ~~focussed~~focused can be moved further or closer to the center of the disk 1. Thirdly, the lens holder 8 can be tilted, i.e. it can carry out rotations about a tangent direction x. In this way, the light beam 4 can be ~~focussed~~focused on the disk 1 in such a way that it is always locally perpendicular to the surface of the disk, despite any inclination of the disk.

Replace the paragraph on page 5, lines 20-25, of the specification with the following:

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The actuator arrangement comprises only two ~~focussing~~focusing coils, viz. a first ~~focussing~~focusing coil 9 and a second ~~focussing~~focusing coil 10. The winding axis of each coil is parallel to the ~~focussing~~focusing direction z. The ~~focussing~~focusing coils 9, 10 are fixed to the lens holder 8. A magnetic circuit is provided for each of the ~~focussing~~focusing coils 9, 10. This magnetic circuit comprises a yoke 11 and a permanent magnet 12. Of course, a yoke and an electromagnet could also be used in principle.

Replace the paragraph on page 5, lines 26-32, of the specification with the following:

A current flowing through one of the ~~focussing~~focusing coils 9, 10 will give rise to a force in the ~~focussing~~focusing direction z. Turning to Fig. 2, it will be more clearly appreciated that the first and second ~~focussing~~focusing coils 9, 10 are positioned on opposite sides of a plane through the center of mass of the lens holder 8 and parallel to the ~~focussing~~focusing direction z and the tangent direction x. The dashed line ~~1~~50 lies in this plane. Due to such positioning, an unbalance between the forces generated when the first and second ~~focussing~~focusing coils 9, 10 are driven will result in a tilting action of the lens holder 8.

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Replace the paragraph spanning pages 5-6, between line 33, page 5 and line 15, page 6, of the specification with the following:

It will be apparent from Fig. 2 that the first and second ~~focussing~~focusing coils 9, 10 are quite large relative to the dimensions of the lens holder 8. The windings must be quite large to capture enough magnetic flux to generate the required force. Alternatively, of course, the height of the coils 9, 10 and the number of windings could be increased, but this is undesirable since the lens holder 8 must be as flat as possible and should have a low mass. The current could also be increased, but this would lead to the development of heat and, consequently, a lower efficiency. To achieve a compact lens holder 8, therefore, the first and second ~~focussing~~focusing coils 9, 10 are spaced apart in the tangent direction x, that is in this case at opposite ends of the lens holder 8. This enables the winding axes to be positioned closer to the plane through the center of mass of the lens holder 8. Note that the distance d between the plane through the center of mass of the lens holder 8 and the line ~~1~~50 is smaller than the distance from the winding axis to the outer edge of the winding of the ~~focussing~~focusing coils 9,10 in a lateral direction parallel to the tangent direction. This is only possible because the ~~focussing~~focusing coils 9, 10 are spaced apart in the tangent direction. The compact construction of the read/write head 6 makes it possible to move the read/write head 6 closer to the center of

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the disk 1. This means that a larger area of the disk 1 close to the center becomes available for storing information.

Replace the paragraph on page 6, lines 16-25, of the specification with the following:

As may be surmized from Fig. 2, the ~~focussing~~focusing coils 9, 10 are point-symmetrically arranged relative to the center of mass of the lens holder 8. They are not only arranged at equal distances to a plane through the center of mass and parallel to the ~~focussing~~focusing direction z and the tangent direction x, but also at equal distances to a plane through the center of mass and parallel to the ~~focussing~~focusing direction z and the tracking direction y. Although measures, to be described below, have been taken to dampen oscillation of the lens holder 8, the lens holder 8 and the suspension thereof can be viewed as a spring-mass system with certain resonance frequencies. The generation of parasitic oscillations is more effectively suppressed by arranging the actuators such that force is symmetrically applied to the lens holder 8.

Replace the paragraph spanning pages 6-7, between line 26, page 6 and line 4, page 7, of the specification with the following:

An arrangement other than that of Figs. 1 and 2, wherein the ~~focussing~~focusing coils 9, 10 are mounted on the support frame and

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the permanent magnets 12, with or without a yoke, are mounted on the lens holder 8, is also possible. This may be necessary if large currents are needed and heat cannot be effectively transferred from the lens holder 8. However, from the point of actuator control it is desirable to use the arrangement shown in the drawings. The permanent magnet 12 is susceptible to forces generated by stray electromagnetic fields, such as those generated by the disk drive motor 3. If permanent magnets were to be mounted on the lens holder 8, the lens holder 8 would move in an uncontrollable way under the influences of such stray fields. In addition, the shown arrangement is generally lower in weight, making the lens holder 8 more responsive, which is desirable from the point of view of controlling its position and orientation. Furthermore, it has become apparent in practice, that a configuration in which the lens holder 8 carries the coils 9, 10 is more efficient if the heat dissipation can be controlled.

Replace the paragraph on page 7, lines 5-14 of the specification with the following:

The arrangement of each of the two magnetic circuits formed by the yokes 11 and permanent magnets 12 is very compact and efficient. In the arrangement of the invention, almost all of the flux generated by the permanent magnet 12 is concentrated in the yoke 11 which is made of a material with a high magnetic permeability. The yokes 11 extend through the corresponding ~~focussing~~focusing coil along its winding axis. As is apparent from

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the Figs 1 and 2, the magnetic circuit comprises an air gap 13. The air gap 13 defines the face of the yoke where the flux leaves the yoke. The windings of the first and second ~~focussing~~focusing coils 9, 10 thus intersect the flux passing from the face of the yoke through the air gap to the magnet 12. Because the flux is conducted through the center of the coils 9, 10, maximum interaction with the current flowing through the coils 9, 10 is ensured.

Replace the paragraph on page 7, lines 15-19 of the specification with the following:

According to the invention, the same magnetic circuit is also used for the actuator arrangement used to control movement in the tracking direction y. The magnetic circuit forms a loop in a plane parallel to the ~~focussing~~focusing direction z and the tangential direction x. The flux is, therefore, also parallel to the tangential direction x at a point in the circuit.

Replace the paragraph on page 8, lines 3-6 of the specification with the following:

The wire members 15 limit the number of degrees of freedom of the lens holder 8. Only translations in the tracking direction y and the ~~focussing~~focusing direction z are possible. Only tilt about the tangent direction x is allowed. In particular, tilt about the

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~~focussing~~focusing direction z and the tracking direction y is not possible.

Replace the paragraph on page 8, lines 7-24 of the specification with the following:

The wire members 15 are preferably electrically conductive so that they can be used for applying driving currents to the radial coils 14 and the first and second ~~focussing~~focusing coils 9, 10. Turning to Fig. 3, it will be seen that four wire members 15 exactly suffice for providing the required driving currents. The control circuit (not shown) provides three control signals to the actuator arrangement. A radial coil control signal 17 determines movement in the tracking direction; the direction of the driving current then determines whether this movement is towards or away from the center of the disk 1. A focus control signal 18 controls the ~~focussing~~focusing of the beam 4 by the objective lens 7 through the position of the lens holder 8 in the ~~focussing~~focusing direction z. A tilt control signal 19 controls the degree and direction of tilt of the lens holder 8. The tilt control signal 19 is added to the focus control signal 18 for the first ~~focussing~~focusing coil 9, and subtracted for the second 10, to obtain the driving current. Thus, the first and second ~~focussing~~focusing coils 9, 10 are provided with different driving currents to enable tilt. The radial coils 14 are all provided with the same driving current. They are, therefore, connected in series. One of the conductive wire members 15 is a common wire whereto the

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series-connected radial coils 14 and each of the ~~focussing~~focusing coils 9, 10 are connected at one end. Current to the radial coils 14 is supplied through a second wire member 15. Current to the first and second ~~focussing~~focusing coils 9, 10 is supplied through a third and a fourth wire member 15.

Replace the paragraph spanning pages 8-9, between page 8, line 30 and page 9, line 2 of the specification with the following:

The invention is not limited to the above embodiments which may be varied within the scope of the claims. For example, it is not strictly necessary that the lens holder be suspended by rod-shaped wire members. Blades shaped to form hinges could also be used, but would be much stiffer, thus necessitating a larger force to tilt the lens holder. Further, although a single objective lens 7 is used in the described embodiment, the lens holder may comprise a more elaborate optical system for ~~focussing~~focusing and/or splitting the beam, depending on the complexity of the optical drive.

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